Abstract

For several years we’ve been working on teaching elementary school students to reason about programs [1-2]. We believe that teaching this kind of reasoning is as important as teaching students to write programs. Prior research shows that students often have challenges reasoning about programs and need scaffolds [3]. Thus, to facilitate development of this cognitive skill in young children it is important to choose the right domain and provide appropriate supports.

We use Kodu Game Lab because one can write interesting, non-trivial programs in two to four lines. Prior work shows that analyzing these programs is within the abilities of a typical 8-11 year old [4].

Reasoning about programs requires students to understand the structure of code

Reasoning

★ First rule labeled with a P or UP identifies the first object pursued, no matter what rules come before or after that rule
★ No other Pursue rule will run until all of the first pursued objects are consumed
★ First rule labeled with a C or UC identifies the first object consumed
★ No other Consume rule will run until all of the first consumed objects are consumed

Couplets Procedure

1. Label all Pursue Rules “P” and all Consume Rules “C”
2. Draw arrows from each P to the corresponding C
3. Find any rule that isn’t paired; place a U in front of the rule letter e.g, UP - Unpaired Pursue or UC - Unpaired Consume

Applying Laws to Understand & Predict Behavior of Programs

First Law of KODU
Each rule picks the closest matching object.

Second Law of KODU
Any rule that can run, will run.

What will the Kodu eat first? When will the Kodu eat a starfish?

What will the Kodu eat first? When will the Kodu eat a starfish?

Couplets: Helping Elementary School Students Recognize Structure in Code

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Acknowledgements: Funded by a gift from Microsoft Research.

References: